in Stephens's collection; the descriptions in his works however are not taken from these specimens, but borrowed from Denny.

Euplectus Kirbii, Denny, of which I have examined the original specimen in the British Museum, is not identical with *E. signatus*, as Erichson and Aubé suppose, but with *E. Fischeri*, Aubé (*Tischeri*, Heer). Denny has overlooked the pit in the forehead which characterizes this species.

Stephens refers the *Euplectus sanguineus*, Denny, as a synonym to *E. minutus* of Marsham, but incorrectly; the specimen of the latter differs in nothing from an ordinary *E. signatus*.

E. ruficornis, Ste., is synonymous with *E. ambiguus*, Reichb.

Bythinus grandipalpus, Ste., is the female of *B. Curtisii*, Denny.

Bryaxis assimilis, Curt., I have not seen.

The specimen named *Bryaxis insignis*, Reichb., in Stephens's collection, does not agree at all with the true *P. insignis*, Reichb. (=*Tyrus mucronatus*), but is the same insect as *Bryaxis juncorum*.

VI.—*On the mode of growth in* Oscillatoria *and allied genera.*

By John Ralfs, M.R.C.S., Penzance*.

The growth of the lower Algæ by repeated transverse division of their cells is now a well-established fact. In the *Desmidieæ* and the *Palmelleæ* this division is usually complete and gives rise to distinct individuals. In the latter family the common gelatinous matrix mostly retains them in such close connection that the entire mass is regarded as a frond, of which the cells are only portions. The case is essentially similar in the *Desmidieæ*; but in them the common matrix is so exceedingly thin that it can scarcely be detected, whilst the slightest touch scatters the cells, rendering their independence apparent, and hence each individual is considered a frond.

In *Tiresias* and many other simple, filamentous Algæ, the divided cells remain closely united, and form a jointed filament which continues to elongate until the cells cease to divide.

I believe that in *Oscillatoria* we may trace a mode of growth of an intermediate kind and connecting these extremes. In many species of this genus the stratum spreads with great rapidity. This rapid growth cannot be caused by zoospores or granules vegetating in constant succession, because, although the filaments vary in length, their breadth is uniform. It does not depend on the simple elongation of the filaments, because, in many species, the filaments always remain short, notwithstanding the great increase of the mass.

The difficulty of tracing the growth in *Oscillatoria* is enhanced by its cells being frequently confluent, or having their divisions

* Read before the Botanical Society of Edinburgh, December 14, 1848.

marked merely by faint transverse striæ. Still that the cells divide as in the other simple Algæ will scarcely be contested, if indeed the fact be not sufficiently proved in those species which have some of the striæ about twice the ordinary distance apart, as is always the case when cells are dividing.

In general the cells are indicated, as I have just stated, by more or less evident transverse, straight striæ; but at certain intervals the junction margins become rounded during division and the filament separates into distinct portions. All the *Oscillatorieæ* have the filaments inclosed in sheaths. When the sheath divides together with the cell, the original filament at once forms two; and as this process is continually going on, we can easily conceive the rapid extension of the stratum consequent upon the progressive increase in the number of filaments.

It may be necessary to mention, that it is easy to distinguish between a natural separation and a fracture. In the latter case the ends formed by violence are abrupt; in the former they are usually rounded.

When, as in some species, there is a complete separation of the internal filament unaccompanied by simultaneous division of its sheath, the latter retains the portions in connection. *Lyngbya ferruginea* affords a good example of this kind, and as its filaments are stouter than those of most species of *Oscillatoria*, no better plant can be selected for observation. If a portion of the stratum be examined, filaments of various lengths may be seen mingled together; but they are all of the same breadth, although some of them are not longer than broad.

When separated portions are thus held together by the sheath, there is generally a short interval between them. Whether this results from an elongation of the sheath or the mutual repulsion of the inclosed portions is doubtful. The latter I consider as the more likely cause. May it not be produced by an electric current developed at the instant of partition? Perhaps the radiation of the filaments from the stratum, in some species of *Oscillatoria*, may be similarly accounted for.

Microcoleus is known by its numerous, short, simple *Oscillatoria*-like filaments being contained within either a simple or a slightly branched, inflated sheath or frond. The presence indeed of this common covering is the character which separates *Microcoleus* from *Oscillatoria*; for the filaments and their manner of division are alike in both.

In *Oscillatoria* the parted filaments are retained together merely by the common mucus which permits a comparatively wider range, and allows them to diverge in various directions. In *Microcoleus*, on the contrary, their freedom is restricted; the frond by its form and size keeps them parallel and binds them

in bundles. At first the frond contains only one or two filaments (as correctly stated by Mr. Hassall in his 'British Freshwater Algæ'); but these dividing as in *Oscillatoria,* the inflated frond becomes completely filled and at length ruptured, when the filaments escape from it to form new plants.

I intend in a future communication to offer some evidence in proof that the appositional branches in *Rivularia, Calothrix* and other genera are merely modifications of the mode of growth here described.

VII.—*On the Structure of the Teeth of some Fossil Fish of the Carboniferous Period.* By Prof. Owen, F.R.S.

To the Editors of the Annals of Natural History.

Gentlemen,

In the interesting and instructive summary of the modifications of the teeth in fossil fishes of the carboniferous period which Mr. M'Coy has given in the 'Proceedings of the Cambridge Philosophical Society,' June 1848, he notices a layer of true enamel in '*Centrodus,*' which he says "is quite distinct from that dense modification of *dentine,* which, forming the polished surface of most fish-teeth, has been confounded with true enamel, but which it is here proposed to call '*ganoine*' in future descriptions" (p. 65). I have long been in the habit of applying the term 'ganoine' to the peculiar tissue which forms the enamel-like surface of 'ganoid scales;' but, as the term has been published by me in no other way than orally in lectures, I should be willing to resign it for the new dental tissue which Mr. M'Coy professes to have discovered, if his claim to the discovery were sound. If I mistake not, Mr. M'Coy first announced his discovery in your 'August Number' of the present year, p. 124, where, after animadverting on the frequent mistake of his new modification of dentine for true enamel, he says: "The latter is, however, secreted by a distinct organ quite external to and independent of the dentine, while the false enamel, which I propose to call 'ganoine,' is merely produced by the calcigerous tubes of the dentine becoming suddenly straighter, closer and more numerous as they approach the surface" (p. 124).

In my 'Odontography' I defined what I believe to be the 'ganoine' of Mr. M'Coy in the following words: "In some instances, as in the teeth of the flying-fish (*Exocœtus*) and sucking-fish (*Remora*), the substance of the tooth is uniform, and not covered by a layer of a denser texture. In others, as the shark, sphyræna, &c., the tooth is coated with a dense, shining, enamel-